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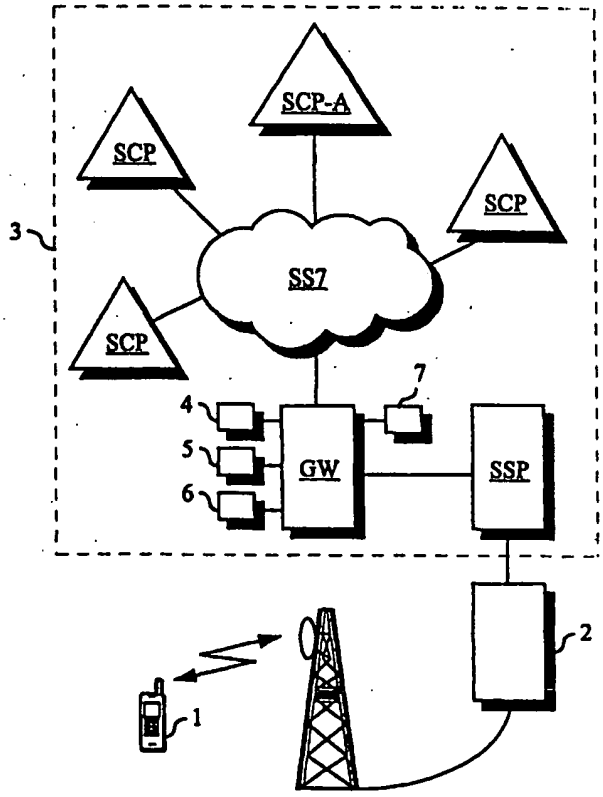
(54) Title: METHOD AND SYSTEM FOR FORMING A TELECOMMUNICATION CONNECTION

(57) Abstract

System for establishing and controlling a telecommunication connection in a telecommunication network comprising a telecommunication terminal (1), a telephone exchange (2) and an intelligent network (3) comprising a service switching point (SSP), a gateway (GW), a signaling network (SS7) and one or more service control points (SCP). The service switching point (SSP) is connected to the gateway (GW) and the gateway is further connected to the signaling network (SS7). The service control points (SCP) are connected to the signaling network (SS7). In the method of the invention, the establishment and control of the telecommunication connection are managed by means of the intelligent network. The signaling associated with the telecommunication connection to be established is directed to a predetermined service control point (SCP–A) by setting the A–party number as the Global Title address of the signaling message.



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METHOD AND SYSTEM FOR FORMING A TELECOMMUNICATION CONNECTION

FIELD OF THE INVENTION

The present invention relates to telecommunication technology. In particular, the object of the invention is to create a new method and system in which the setup of a telecommunication connection is controlled by means of an intelligent network.

BACKGROUND OF THE INVENTION

'Intelligent network' refers to a network which makes it possible to provide diversified services in the traditional telephone network. The concept of an intelligent network originally arose from a need to develop new telephone services faster and at a lower cost. On the other hand, the aim has also been to develop the controllability and adaptability of services.

Today, telephone operators primarily sell services to their customers. To be successful in the competition, telephone operators must be able to provide personal, individualized and readily manageable services to their customers. These market pressures toward change can be at least partially met by using intelligent networks.

In the future, intelligent network services will be expanded and diversified. Therefore, intelligent networks should be capable of cooperating as traditional telephone networks are at present. The development is advancing toward a situation where one service control point must be able to control as many different services as possible. This means centralized control of the intelligent network.

STATE OF THE ART

An intelligent network consists of switching, controlling and functional components, i.e. signaling points (SP), and a signaling network connecting these. A service switching point (SSP) is a modified telephone exchange which analyzes the traffic passing through it. Upon detecting a given number that meets a triggering criterion, the service switching point sends a service request to a service control point (SCP). Service switching points are connected via common channel signaling channels to service control points, which implement intelligent network services by utilizing a database. For example, a service control point may perform a number conversion from B-party number to C-party number.

The information required for the control of the service is stored in a database (SDP, Service Data Point), where the service control point can get the information it needs. For instance, if the service includes a recorded message, the service control point may control an intelligent peripheral (IP) implementing the desired recording.

Service switching points are connected via signaling channels to service control points, which implement intelligent network services by utilizing a service database. For example, a service control point may perform a number conversion from B-party number to C-party number by retrieving from the service database the C-party number corresponding to the B-party number.

The communication protocols used in the intelligent network consist of rules observed in the communication between the components of the intelligent network. The protocol defines the interfaces between the components as well as the structure of the messages to be exchanged. The intelligent network components communicate with each other using common chan-

nel signaling (CCS). As an ITU-T specification, common channel signaling is known as CCSS No7. In communication between components, the intelligent network utilizes the services of the INAP (INAP, Intelligent Network Application Part) defined by ITU-T. The INAP application part is an intelligent network application protocol used e.g. in the communication between a service control point and a service switching point.

The basic idea of common channel signaling is to transmit speech or data in separate channels and to control the transmission of speech or data using separate signaling channels. The signaling used to control communication in a telecommunication network is transmitted as messages in the form of packets, which are directed from one point to another by using the layers of the CCSS7 network. These layers include e.g. the MTP layer (MTP, Message Transfer Part) and the SCCP layer (SCCP, Service Connection and Control Part), which is an extension of the MTP layer services. In practice, these layers are implemented using applications located in the signaling points. Upon the SCCP layer, it is possible to implement user-specific applications, e.g. software needed for the setup of telecommunication connections.

In the MTP layer, the addresses of network components are formed using a 14-bit code, which is insufficient in a global network. The SCCP layer allows the use of a so-called global title (GT), enabling the transmission of global common channel signaling messages.

Signaling is sent as signaling messages containing information needed by the user parts. A signaling message comprises a signaling information field (SIF), which contains the information needed by the user part, such as data, call control signals, management and maintenance data as well as message type and format.

The signaling message is generated by adding information defined at a higher hierarchy level to the frame structure used by the MTP layer. This is done by forming in the user parts a so-called SCCP message and inserting the SCCP message into the signaling information field of a message signaling unit (MSU).

The signaling information field contains a label which enables the message to be routed through the signaling network to the destination point. The standardized label contains a part called routing label. The routing label consists of an originating point code (OPC) and a destination point code (DPC). Each signaling point in the signaling network has its own unique address. By placing the unique addresses of the components in the OPC and DPC fields, the signaling messages can be directed from one signaling point to another.

In the SCCP layer, Global Title analysis and conversion are performed, whereupon the converted address information is added as a destination point code to the label of the signaling information field. After this, the signaling message is sent to the MTP layer, which takes care of conveying the signaling message to the receiving signaling point on the basis of destination point code. At the destination point, the message is directed from the MTP layer to higher hierarchy levels and further to the desired user part.

A problem with the intelligent network architectures currently used is their decentralized structure, which is inexpedient in certain situations. In prior-art intelligent network architectures, a connection to be set up has to be unnecessarily circulated through various components of the intelligent network, thus needlessly taking up transmission capacity in the network. A further problem is that the management of number-based services (e.g. numbers beginning with 0800 and 020) and traffic is decentralized among dif-

ferent parts of the network instead of being handled in a centralized manner.

The solution to this problem is centralization of functions, which will result in a more flexible intelligent network structure that is also easier to maintain and update. In a centralized intelligent network structure, the intelligence and the switching components of the network are separated from each other, which will make it possible to reduce the prices of the centralizing and switching network components. Moreover, communication in the network is controlled by a centralized network intelligence, allowing more effective utilization of the transmission capacity. In a centralized intelligent network structure, it is essential that the signaling traffic associated with calls can be directed directly to a predetermined service control point. This cannot be accomplished at present. Instead, there are prior-art methods in which queries addressed to a given subscriber can be directed to a certain control point on the basis of the B-party number or MSISDN number (MSISDN, Mobile Subscriber International ISDN Number). Such a method is used in MAP queries (MAP, Mobile Application Part) in the GSM system (GSM, Global System for Mobile communications).

The object of the invention is to eliminate the drawbacks referred to above or at least to significantly alleviate them.

A specific object of the invention is to disclose a new type of method in which the signaling traffic associated with a telecommunication connection is directed from a service switching point to a service control point on the basis of the subscriber number of the A-party.

As for the features characteristic of the invention, reference is made to the claims.

BRIEF DESCRIPTION OF THE INVENTION

Using the method and system of the invention, a telecommunication connection is set up in a telecommunication network comprising a telecommunication terminal, a telephone exchange and an intelligent network, which again comprises a service switching point, a gateway, a signaling network and one or more service control points. The service control point is connected to the gateway and the gateway is connected to the signaling network. The service control points are also connected to the signaling network.

In the method and system of the invention, the setup and control of the telecommunication connection are managed by means of the intelligent network. This is done by directing the signaling associated with the telecommunication connection to be set up to a given service control point on the basis of the A-party number and/or corresponding information.

In the method of the invention, the A-party calls an intelligent network number. From the telecommunication terminal, a call setup message is transmitted, from which the A-party number or corresponding information is determined. This is done in the same way in which the B-party number is determined in currently known technology. In a preferred embodiment of the invention, the A-party number is determined using an application according to the invention, which can be placed in the telephone exchange, in the gateway or in the service switching point.

After the A-party number has been determined, the gateway is called using the A-party number and/or corresponding information as call address.

In the method of the invention, an SCCP message is generated and the A-party number is placed in the Global Title filed of the SCCP message. The SCCP message and its generation are part of prior-art technology, which is described in literature and appropri-

ate standards. To set the A-party number in the Global Title field, it is possible to use e.g. prior-art techniques applied to set the B-party number or an application according to the invention.

Next, a signaling message is generated. This is done by inserting the SCCP message into a message signaling unit. The destination address of the signaling message is determined by analyzing the Global Title address field and converting the Global Title address into a corresponding destination point code. This is accomplished by applying prior-art techniques or by using an application according to the invention. The correspondence between the Global Title address and the destination point code is determined e.g. using a database and an application according to the invention.

The signaling message is then directed to a predetermined service control point on the basis of the destination point code. This is done using the MTP layer and the signaling network in accordance with known technology. After that, based on the information contained in the signaling message, a connection from the service control point to the service switching point is set up. This is accomplished by means of the user parts and the SCCP layer according to known technology. Finally, the setup and control of the telecommunication connection is carried on by the service switching point in accordance with commands executed by the service control point.

In a preferred embodiment of the invention, the load situation in the telecommunication network is managed by defining the service control points corresponding to A-parties and distributing the A-parties among predetermined service control points on the basis of Global Title analyses performed in the signaling network. This is accomplished e.g. by using a database and an application according to the invention.

As the Global Title analysis practically means retrieving the unique address of the service control point corresponding to the Global Title address from the database, the workload on the telecommunication network can be distributed by changing these correspondences.

The invention makes it possible to implement a centralized intelligent network structure. In particular, the method of the invention enables the calls and/or services of a given subscriber to be routed via a predetermined service control point, thus contributing to the implementation of a centralized intelligent network structure. Moreover, the method of the invention can be used for controlling the load situation in a telecommunication network.

LIST OF ILLUSTRATIONS

In the following, the invention will be described in detail by the aid of some of its embodiments with reference to the drawings, wherein

Fig. 1 presents a system according to the invention; and

Fig. 2 presents a functional block diagram of the method of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The system illustrated in Fig. 1 comprises a telecommunication terminal (1), a telephone exchange (2) comprising means for the processing of call setup messages, and an intelligent network (3) comprising a service switching point (SSP), a gateway (GW), a signaling network (SS7) and one or more service control points (SCP). The service switching point (SSP) is connected to the gateway (GW) and the gateway is connected to the signaling network (SS7). The service control points (SCP) are also connected to the signal-

ing network (SS7). The gateway (GW) comprises means (4) for inserting the A-party number and/or corresponding information into the Global Title field of the SCCP message and means (5) for the processing of SCCP messages. Moreover, the gateway (GW) comprises means (6) for controlling the load situation in the telecommunication network and means (7) for directing A-parties to predetermined service control points (SCP-A) on the basis of Global Title analyses.

In Fig. 2, block 21, an A-party calls a desired B-party number and a call setup message is sent from the telecommunication terminal (1). In block 22, the A-party number or corresponding information is determined from the call setup message. In block 23, a SCCP message is generated in a service switching point (SSP). In block 24, the gateway (GW) is called using the A-party number or corresponding information as call address. In block 25, the A-party number is inserted into the Global Title address field. In block 26, a signaling message is generated by adding the SCCP message to a message signaling unit, the destination point code of the signaling message is determined by analyzing the Global Title address field and the Global Title address is converted into a corresponding destination point code. In block 27, the signaling message is directed to a predetermined service control point (SCP-A) on the basis of the destination point code. In block 28, based on the signaling message, a connection is set up from the service control point to the service switching point.

The invention is not restricted to the examples of its embodiments described above, but many variations are possible within the scope of the inventive idea defined in the claims

CLAIMS

1. Method for establishing and controlling a telecommunication connection in a telecommunication network comprising a telecommunication terminal (1), a telephone exchange (2) comprising means for the processing of call setup messages, and an intelligent network (3) comprising a service switching point (SSP), a gateway (GW), a signaling network (SS7) and one or more service control points (SCP), the said service switching point (SSP) being connected to the said gateway (GW) and the said gateway being connected to the signaling network (SS7) and the said service control points (SCP) being connected to the said signaling network (SS7), and in which method the establishment and control of the telecommunication connection is managed by means of the intelligent network by directing the signaling associated with the telecommunication connection to be established to a predetermined service control point (SCP-A), characterised in that the signaling associated with the telecommunication connection to be established is directed to the predetermined service control point (SCP-A) on the basis of the A-party number and/or corresponding information.

2. Method as defined in claim 1, characterised in that

the A-party number and/or corresponding information is determined from the call setup message;

the gateway is called using the A-party number and/or corresponding information as call address; and

a SCCP message is generated and the A-party number and/or corresponding information is set in the Global Title address field of the SCCP message.

3. Method as defined in claim 1 or 2, characterised in that the routing label of the signaling message is determined by analyzing the Global Title address field in the SCCP layer and converting the

Global Title address into a corresponding destination point code.

4. Method as defined in claims 1 - 3, characterised in that

the signaling message is generated by inserting the SCCP message into the signaling information field of a message signaling unit;

the signaling message is directed to a predetermined service control point (SCP-A) on the basis of the routing label; and

based on the signaling message, a connection is established from the service control point (SCP-A) to the service switching point (SSP).

5. Method as defined in any one of claims 1 - 4, characterised in that the load situation in the telecommunication network is managed by defining service control points corresponding to the A-parties and distributing the A-parties between predetermined service control points (SCP-A) on the basis of Global Title analyses performed in the signaling network (4).

6. System for establishing and controlling a telecommunication connection in a telecommunication network comprising a telecommunication terminal (1), a telephone exchange (2) comprising means for the processing of call setup messages, and an intelligent network (3) comprising a service switching point (SSP), a gateway (GW), a signaling network (SS7) and one or more service control points (SCP), the said service switching point (SSP) being connected to the said gateway (GW) and the said gateway being connected to the said signaling network (SS7) and the said service control points (SCP) being connected to the said signaling network (SS7), and in which system the establishment and control of the telecommunication connection is managed by means of the intelligent network by directing the signaling associated with the telecommunication connection to be established to a predeter-

mined service control point (SCP-A), characterised in that

the service switching point (SSP) comprises means for determining the A-party number and/or corresponding information from the call setup message; and

the gateway (GW) comprises means (4) for setting the A-party number and/or corresponding information into the Global Title address field of the SCCP message and means (5) for the processing of SCCP messages.

7. System as defined in claim 6, characterised in that the gateway (GW) comprises means (6) for managing the load situation in the telecommunication network and means (7) for distributing the A-parties among predetermined service control points (SCP-A) on the basis of Global Title analyses.

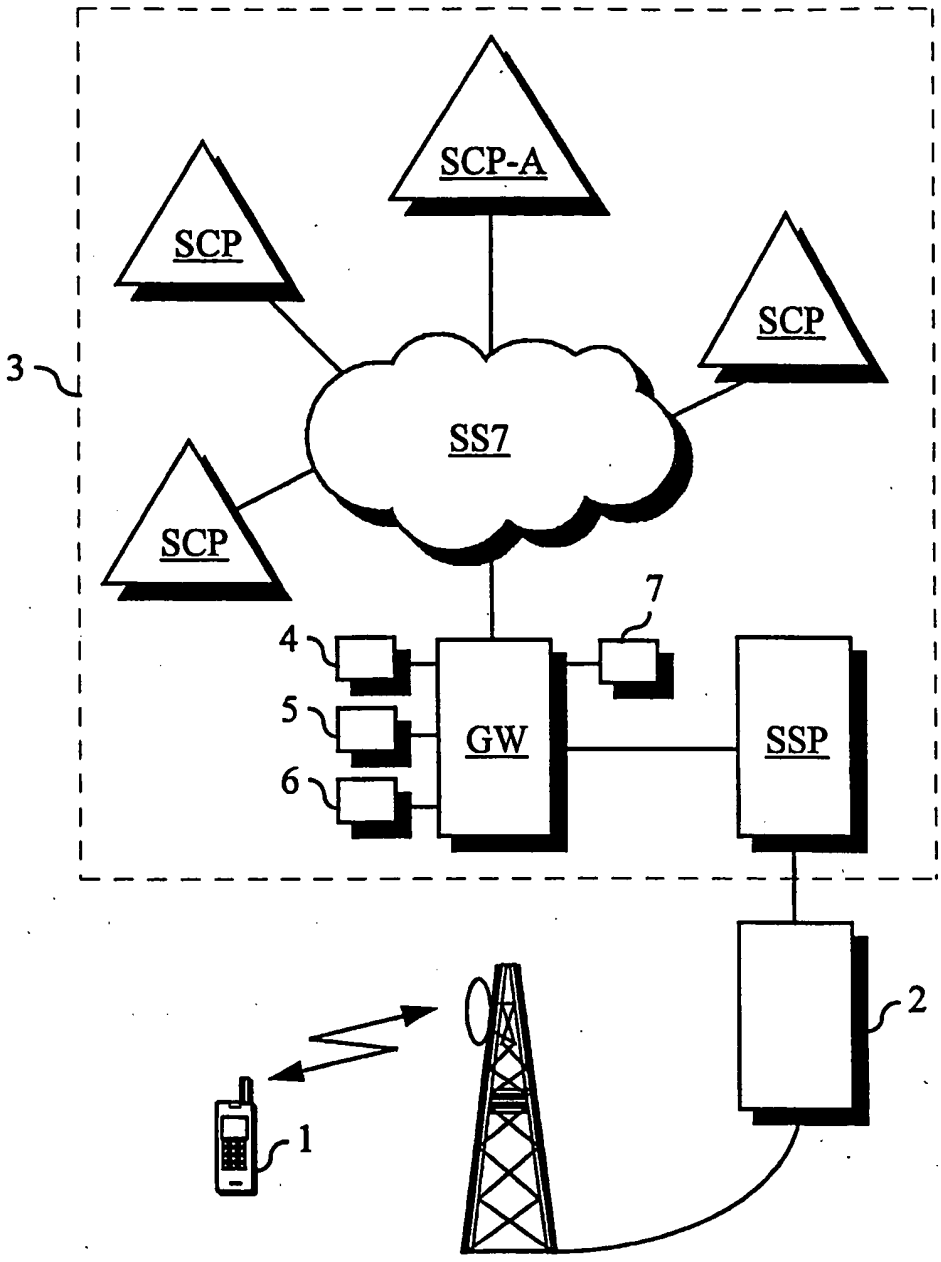

Fig 1

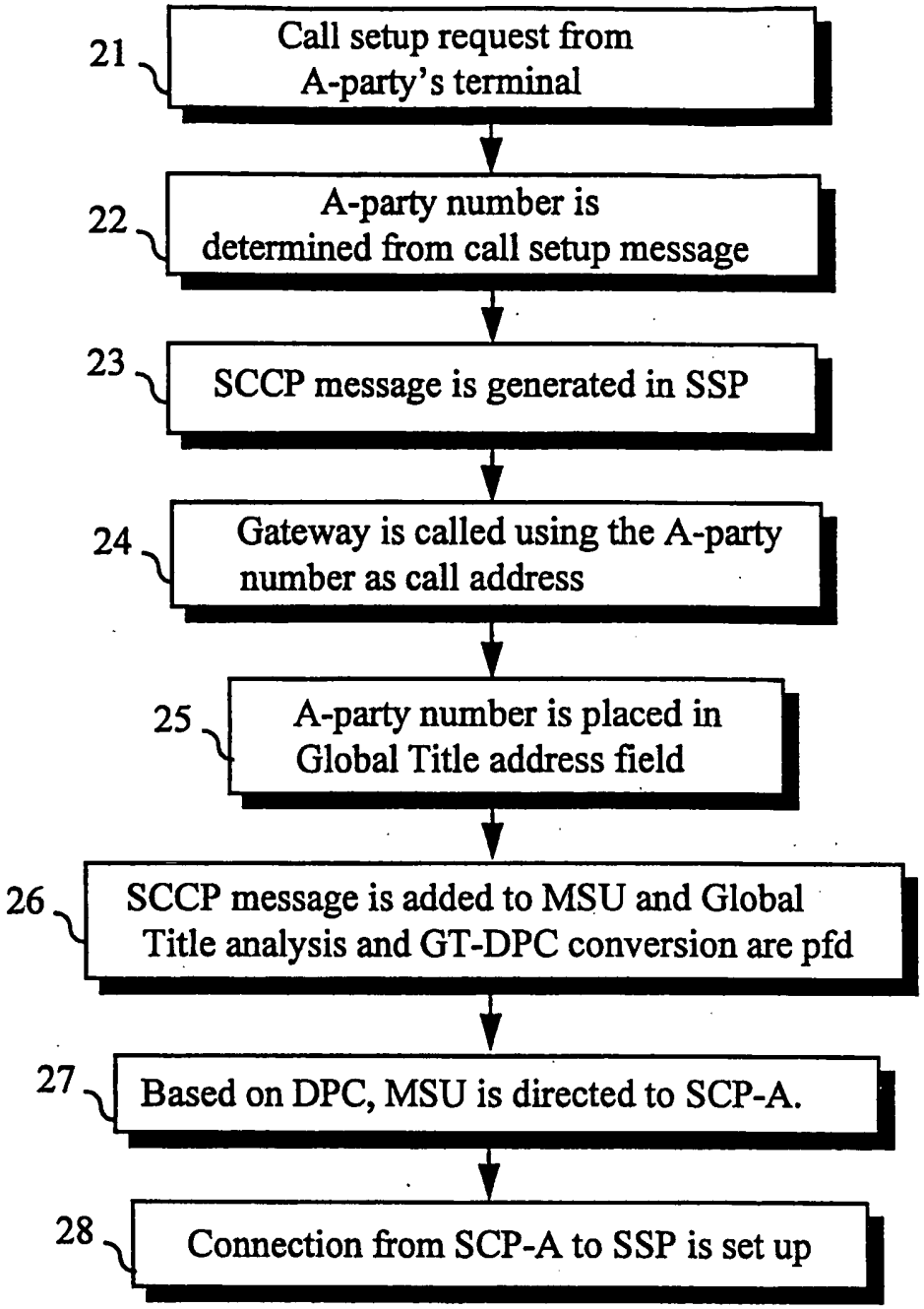
21
Call setup request from A-party's terminal
22
A-party number is determined from call setup message
23
SCCP message is generated in SSP
24
Gateway is called using the A-party number as call address
25
A-party number is placed in Global Title address field
26
SCCP message is added to MSU and Global Title analysis and GT-DPC conversion are pfd
27
Based on DPC, MSU is directed to SCP-A.
28
Connection from SCP-A to SSP is set up

Fig 2

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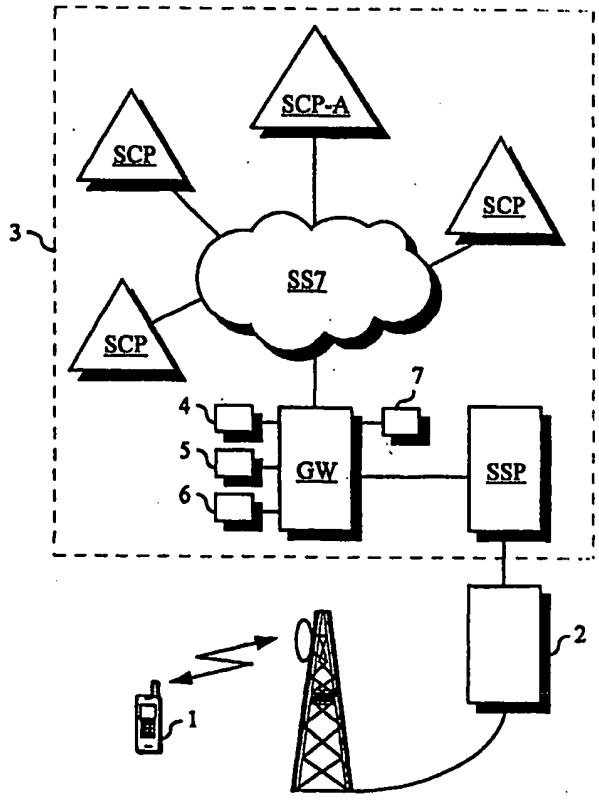

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A. CLASSIFICATION OF SUBJECT MATTER

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 8214063 A (FUJITSU LTD) 1996-08-20 (abstract) World Patents Index (online). London, U.K.: Derwent Publications, Ltd. (retrieved on 2000-04-07) Retrieved from: EPO WPI Database. DW199643, Accession No. 1996-431067 & JP 8214063 A (FUJITSU LTD) 1996-12-26 (abstract) (online) (retrieved on 2000-04-07).Retrieved from: EPO PAJ Database.	1,5
Y	--	2-4,6-7
X	EP 0534673 A2 (AMERICAN TELEPHONE AND TELEGRAPH COMPANY), 31 March 1993 (31.03.93)	1
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Date of the actual completion of the international search	Date of mailing of the international search report
7 April 2000	13 -04- 2000
Name and mailing address of the ISA Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Stefan Hermansson/MP Telephone No. +46 8 782 25 00

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 99/00844

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